DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING and COMPLIANCE DIVISION
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES)

Statement of Basis

PERMITTEE:	Missoula County Commissioners, Missoula County Rural Sewer Improvement District 901
PERMIT NUMBER:	MT0020168
RECEIVING WATER:	Bitterroot River
FACILITY INFORMATION:	
Name:	Lolo Sewer and Water District Wastewater Treatment Plant
Location:	1755 Lakeside Drive Lolo, MT 59847
Contact:	Dave Haverfield, Superintendent PO Box 476 Lolo, MT 59847 (406)2 73-2733
FEE INFORMATION:	
Number of Outfalls:	1 (for fee determination purposes)
Type of Outfall:	001 – Continuous Discharge to Surface Water

I. Permit Status

The current Montana Pollutant Discharge Elimination System (MPDES) permit for the Missoula County Rural Sewer Improvement District #901 Lolo Sewer & Water District (District) Wastewater Treatment Plant was issued and became effective on July 1, 1993. It expired at midnight, April 30, 1998.

In September of 1997, the District submitted an application and the associated fees for the renewal of the MPDES permit using MT short form 2A. In accordance with ARM 17.30.1313, the permit was administratively extended at that time. On June 28, 2005, an updated complete renewal application package consisting of EPA Forms 1 and 2A was submitted to the Department.

II. Facility Information

A. Facility Description

The Lolo WWTP serves the Lolo Sewer & Water District under Rural Sewer Improvement District # 901 of Missoula County, with a current population of approximately 2,200 (application). The WWTP is an activated sludge mechanical facility with aerobic solids digestion permitted to discharge to the Bitterroot River via Outfall 001. The current design flow is 0.250 million gallons per day (mgd) with chlorine disinfection. The permittee has requested an increased design flow of 0.340 mgd predicated upon the 2002 facility upgrades which allow for a flow increase and an, as yet uncompleted, upgrade to the disinfection system.

The Lolo publicly-owned treatment works (POTW) has a design flow of less than 1 mgd, it has lacked industrial contributors, and is has not been required to have a pretreatment program. However, letters from the permittee, in the administrative file show repeated incidences where the POTW has experienced organic overloading due to commercial users and the lack of pretreatment (2/2000, 8/2001, 1/2002, 12/2005). In 2004 and 2005, the permittee initiated a local pretreatment program with commercial users and has since seen influent loading rates commensurate with the population being served.

The collections system serves over 900 connections with new subdivisions ready for connection at this time. Originally built in 1968, there are over 9 miles of sewer and 2 lift stations. Inflow and Infiltration (I/I) are estimated to be 32,000 gpd (application). In December of 2005, an oil and grease plug in a main sewer line caused back ups and affected one of the District's public water supply well houses. The POTW has increased inspection frequency on this line and now requires pretreatment for oil and grease.

Sludge drying beds are utilized and the resulting biosolids are removed by EKO Compost under the Lolo WWTP authorization MTG650039 for EPA Region VIII Permit Number MTG-650000, General Permit for Facilities/Operations that Generate, Treat, and/or Use/Dispose of Sewage Sludge by Means of Land Application, Landfill, and Surface Disposal Under the National Pollutant Discharge Elimination System.

Table 1 is a summary of the Lolo WWTP design criteria from the Christian, Spring, Sielbach & Associates 1986 and the HDR Engineering, Inc. 2002 Operation and Maintenance Manuals.

Table 1. Current Design Criteria Summary – Lolo WWTP

Facility Description: Continuous discharge, activated sludge system with chlorine disinfection and aerobic sludge digestion.	
Construction Date: November 1986	Modification Date: 2002 additional clarifier, headworks improvement, aeration basin retrofit.
Design Year: 2000	
Design Population: 2,500	Population Served: 2,200
Design Flow, Average (mgd): 0.250, Requested Increased Design Flow (mgd): 0.340	Design Flow, Peak (mgd): 0.625
Minimum Detention Time (Activated Sludge System): 16.2 hours	
Design BOD Removal (%): NA	Design Load (lb/day): 450 lb/day (216 mg/L)
Design SS Removal (%): NA	Design Load (lb/day): 400 lb/day (192 mg/L)
Collection System: Combined [ ] Separate [X]	
SSO Events (Y/N): yes	Number: one
Bypass Events: none reported	Number: NA
Inflow and Infiltration contribution (mgd): 0.032	Source: Infiltration from high groundwater in susceptible areas of town
Disinfection: Yes	Type: Gaseous Chlorination
Discharge Method: Continuous	
Effluent Flow Primary Device: v-notch weir and staff gauge	
Effluent Secondary Flow Device: TN Tech Ultrasonic meter	
Sludge Storage: aerobic digester	
Sludge Disposal: to land application	Authorization Number: MTG650039

B. Effluent Characteristics

Effluent data from the facility Discharge Monitoring Reports (DMR) for the Period of Record (POR) January 2001 through May 2006 are summarized in Table 2.

Table 2: DMR Effluent Characteristics [1] for POR January 2001 through May 2006

Parameter	Location	Units	Previous Permit Limit	Minimum Value	Maximum Value	Average Value	Number of Samples
Flow, Daily Average	Effluent	mgd	[2]	0.119377	0.260693	0.201853	65
Biochemical Oxygen Demand (BOD_5)	Influent	mg/L	[2]	174	1,020	336	65
	Effluent	mg/L	45/30 [3]	<4	84	14.8	65
	NA	% removal	85	88.3	99.1	95.4	65
	Effluent	kg/day	42.6/28.37 [3]	2.9	64.9	11.3	64
		lb/day	93.8/62.4 [3]	6.5	148.7	24.9	
Total Suspended Solids (TSS)	Influent	mg/L	(2)	111	258	180.2	65
	Effluent	mg/L	45/30 [3]	2	19	6.1	65
	NA	% removal	85	86.3	99.0	96.4	65
	Effluent	kg/day	42.6/28.37 [3]	1.45	17.6	4.94	64
		lb/day	93.8/62.4 [3]	3.2	38.8	10.9	
Fecal Coliform Bacteria [4]	Effluent	Number per 100 mL	170,000 / 85,000 [5]	13	41,257	359 (Median Value)	35
pH	Effluent	s.u.	6-9	6.40	8.90	7.65	63
Temperature	Effluent	ºC	(6)	ND	ND	ND	0
Total Residual Chlorine	Effluent	mg/L	0.5 [7]	<0.01	0.70	0.09	34
Total Ammonia as N, annual	Effluent	mg/L	(2)	0.03	22.8	5.91	21
Total Ammonia as N, winter [8]	Effluent	mg/L	(2)	0.09	22.8	10.1	11
Total Ammonia as N, summer [8]	Effluent	mg/L	(2)	0.03	11.1	1.28	10
Total Kjeldahl Nitrogen	Effluent	mg/L	(2)	1.06	30.9	7.74	21
Nitrate + Nitrite as N	Effluent	mg/L	(2)	0.07	20.5	12.9	21
Total Nitrogen, annual [9]	Effluent	mg/L	(2)	14.81	30.97	20.67	21
		lb/day	(2)	25.54	56.14	34.78	21
Total Phosphorus as P, annual	Effluent	mg/L	(2)	1.69	4.83	3.71	21
		lb/day	(2)	2.91	7.82	6.23	21
Dissolved Oxygen	Effluent	mg/L	(6)	ND	ND	ND	0
Oil and Grease	Effluent	mg/L	(6)	ND	ND	ND	0
Total Dissolved Solids	Effluent	mg/L	(6)	ND	ND	ND	0

Footnotes: NA - Not applicable; ND – No data available

(1) Conventional and Non-conventional Pollutants only, table does not include information on toxic pollutants.
(2) No effluent limit in previous permit, monitoring requirement only.
(3) Weekly Average Value/Monthly Average Value.
(4) Sample period is April 1 through October 31.
(5) Weekly Geometric Mean Value/Monthly Geometric Mean Value.
(6) No effluent limit or monitoring requirement in previous permit.
(7) Instantaneous/Daily Maximum Value
(8) Summer period is April 1 through October 31; Winter period id November 1 through March 31.
(9) Calculated as the sum of Nitrate + Nitrite as N and Total Kjeldahl Nitrogen (TKN) concentrations.

Review of the POR data shows the effluent had exceedences of Biochemical Oxygen Demand (BOD_5) limitations in several months. Table 3. shows the violations of both the 30-day limit of 30 mg/L BOD_5 and/or the 7-day limit of 45 mg/L during the POR:

Table 3. Outfall 001 BOD_5 Limit Exceedences during POR

Month	30-Day/7-Day Average Concentration (mg/L BOD_5)					
	2001	2002	2003	2004	2005	2006
January	-	32/48	-	-	-	-
February	-	84/198	-	-	-	-
March	-	41/51	-	-	-	-
July	33	-	-	-	-	-
August	30	-	-	-	-	-

The 30-day loading limitation of 28.37 kg/d was exceeded in February (64.85 kg/d) and March (34.42 kg/d) 2002. The permittee explanations for the exceedences included high organic loading in the influent stream due to commercial sources.

A violation for an effluent exceedence of the Total Residual Chlorine concentration limit (4.0 mg/L reported, 0.5 mg/L daily maximum limit) was issued in February of 2006. This was explained as a transcription error on the DMR, the value should have been 0.4 mg/L according to the permittee. The lack of a laboratory Quality Assurance/Quality Control program was noted as a violation in the October 2006 inspection. The POTW influent sample and flow monitoring point in the facility equalization basin is set up after return flows commingle with facility influent. This was identified as a violation of permit conditions as an inadequate sample point in the October 2006 inspection. The permittee has been required to identify and utilize a representative sample point for influent monitoring purposes.

III. Proposed Technology-Based Effluent Limits (TBELs)

A. Applicability

The Board of Environmental Review has adopted by reference 40 CFR 133 which set minimum treatment requirements for secondary treatment or equivalent for publicly owned treatment works (POTW) [ARM 17.30.1209]. Secondary treatment is defined in terms of effluent quality as measured by BOD_5, TSS, percent removal of BOD_5 and TSS, and pH. National secondary treatment requirements are described on 40 CFR 133 and incorporated into all municipal permits.

Technology-based effluent limits established in the previous permit cycle reflect the use of National Secondary Standards for BOD_5, TSS, BOD_5 and TSS removal efficiencies, and pH. These limitations will be maintained in this permit renewal.

ARM 17.30.1345(8) requires that all effluent limits be expressed in terms of mass except for pollutants which cannot be appropriately expressed in terms of mass. Previous mass-based

limitations utilized the design flow of 0.250 mgd and were expressed in kg/day. However, as the Missoula County Commissioners are requesting an increased design flow for the Lolo WWTP of 0.340 mgd it is necessary to present the increased mass-based load calculations herein. The following equation was used to calculate mass-based loading allocations (in lb/day) using NSS limitations at the requested new design flow of 0.340 mgd.

Load (lb/day) = Design Flow x Concentration Limit (mg/L) x 8.34 (lb·L)/(mg·gal)

BOD_5
Mass-based Load Allocations at upgraded flow:
30-day average BOD_5 load (lb/d) = (0.340 mgd)(30 mg/L)(8.34) = 85.1 lb/d
7-day average BOD_5 load (lb/d) = (0.340 mgd)(45 mg/L)(8.34) = 127.6 lb/d

TSS
Mass-based Load Allocations at upgraded flow:
30-day average TSS load (lb/d) = (0.340 mgd)(30 mg/L)(8.34) = 85.1 lb/d
7-day average TSS load (lb/d) = (0.340 mgd)(45 mg/L)(8.34) = 127.6 lb/d

Loading limits for technology-based parameters of concern (BOD_5 and TSS) will apply to the effluent and will be maintained at the more stringent of the nondegradation allocations or mass-based loading limits calculated in this fact sheet.

B. Nondegradation Load Allocations

The provisions of ARM 17.30.701 - 718 (Nondegradation of Water Quality) apply to new or increased sources of pollution [ARM 17.30.702(18)]. Sources that are in compliance with the conditions of their permit and do not exceed the limits established in the permit or determined from a permit previously issued by the Department are not considered new or increased sources.

Nondegradation threshold values for the Lolo WWTP were calculated for BOD_5 and TSS as part of the renewal of the permit in 1993 based on design criteria from the Christian, Spring, Sielbach & Associates 1986 Operation and Maintenance Manual and permit limitations in affect on April 29, 1993.

The 1993 permit statement of basis for permit renewal did not present the calculated total nitrogen (TN) or total phosphorus as P (TP) nondegradation threshold values. These calculations are presented below, based on the design population from the Christian, Spring, Sielbach & Associates 1986 Operation and Maintenance Manual and the daily per capita TN and TP loads (0.028 and 0.007 pounds per capita per day, respectively) derived from the average loading rates assumed for domestic wastewater in 1993.

Per Capita Contribution Calculation for TN and TP:

Load Limit (lb/day) = Equivalent Population Served x (lb/capita/day)
TN lb/capita/day = 0.028
TP lb/capita/day =0.007

Total Nitrogen Nondegradation Load Allocation:
Design year population = 2,500
(2,500 x 0.028) = 70 lb TN/day

Total Phosphorus Nondegradation Load Allocation:
(2,500 x 0.007) = 17.5 lb TP as P/day

The calculated nondegradation load allocations and the actual average loads discharged from the facility for the period of record (POR) January 2001 through May 2006 are presented below. Actual loads for BOD_5, TSS, TN, and TP were obtained from the facility DMRs. This data indicate that the facility did not exceed the nondegradation load values calculated for BOD_5, TSS, TN and TP.

Table 3. Nondegradation and Actual Loads for POR

Nondegradation Allocated Load Limits				Actual Annual Average Loads (lb/day)					
Parameter	Units	7-Day Annual Average Load	30-Day Annual Average Load	2001	2002	2003	2004	2005	2006
BOD_5	kg/day	42.6	28.37	15.6	22.6	9.7	5.4	6.3	5.9
	lb/day	93.8	62.4	34.3	49.7	21.3	11.9	13.9	13
TSS	kg/day	42.6	28.37	6.7	9.0	3.8	2.5	3.8	3.0
	lb/day	93.8	62.4	14.7	19.8	8.4	5.5	8.4	6.6
TN	lb/day	NA	70	39	39.4	36.2	27.2	32.5	33.1
TP as P	lb/day	NA	17.5	6.59	6.16	6.26	5.08	7.04	6.34

In order to maintain compliance with the provisions of ARM Chapter 30, Subchapter 7, the Department is not allowing an increase in the pollutant load beyond the amount authorized in the existing (1998-issued) permit. Pursuant to these nondegradation provisions, any increased source of pollutants is subject to significance review under the criteria of ARM 17.30.715. The permittee may demonstrate conformance with these criteria by establishing that the increase is nonsignificant. Any relaxation of limits is subject to the public notice requirements of ARM 17.30.1365.

Nondegradation is assessed for the major parameters of concern in the discharge including biological or oxygen consuming materials, as measured by BOD_5, and solids, as measured by TSS. Due to the increased design flow for the WWTP (0.250 mgd to 0.340 mgd), it is necessary to reconcile the BOD_5 and TSS mass-based load allocations at 0.340 mgd with the mass-based load allocations calculated for the 0.250 design flow and previous permit limits. In the case of the Lolo WWTP, these previously calculated mass-based loads are the facility nondegradation allocation loads.

The other major parameters of concern are total nitrogen (TN) and total phosphorus as P (TP). Limitations are proposed to address interim TN and TP loads until the Total Maximum Daily Load (TMDL) is developed in the 2007 -2009 timeframe.

BOD_5 and TSS

The BOD_5 and TSS mass-based loads calculated at the new design flow are compared to the 1993-issued BOD_5 and TSS loads calculated for the facility at the permitted design flow of 0.250 mgd and the limits in effect at the time of issuance. For the Lolo WWTP the BOD_5 and TSS limits are the same (30 mg/L for a 30-day average and 45 mg/L for a 7-day average) and are the nondegradation load limits calculated based on design flow and limits in effect on April 29, 1993.

Mass-based Load Allocations at new design flow (0.340 mgd):
30-day average BOD_5 load (lb/d) = (0.340 mgd)(30 mg/L)(8.34) = 85.1 lb/d
7-day average BOD_5 load (lb/d) = (0.340 mgd)(45 mg/L)(8.34) = 127.6 lb/d

Existing Mass-based Load Allocations (Nondegradation Load Allocations):
30-day average BOD_5 and TSS load = 28.37 kg/day = 62.4 lb/d
7-day average BOD_5 and TSS load = 42.6 kg/d = 93.8 lb/d

The new BOD_5 and TSS mass-based loads calculated at the new design flow are greater than the nondegradation allocations; therefore, the BOD_5 30-day and 7-day loading limitations will be based on the nondegradation loads of 62.4 lb/d and 93.6 lb/d, respectively. The final BOD_5 and TSS effluent concentration limitations are recalculated, herein, to meet these load allocations. The following equation is utilized:

$$\text{Concentration Limit (mg/L)} = \frac{\text{Applicable Load Limit (lb/day)}}{\text{Design Flow (mgd) x 8.34 (lb·L)/(mg·gal)}}$$

$$\text{BOD}_5 \text{ and TSS 30-day Concentration Limit (mg/L)} = \frac{\text{62.4 lb/day}}{\text{0.340 mgd x 8.34 (lb·L)/(mg·gal)}} = 22 \text{ mg/L}$$

$$\text{BOD}_5 \text{ and TSS 7-day Concentration Limit (mg/L)} = \frac{\text{93.8 lb/day}}{\text{0.340 mgd x 8.34 (lb·L)/(mg·gal)}} = 33 \text{ mg/L}$$

The adjustments of parameter concentration limitations to reflect the nondegradation loading allocations will assure effluent loads do not exceed these limitations which would trigger a nondegradation significance determination. Because loadings are to be maintained at the nondegradation threshold allocations, for the purposes of nondegradation, the upgraded facility is not a new or increased source as defined in ARM, 17.30.702(18).

C. Proposed TBELS

Table 4. Outfall 001 Proposed TBELS

Parameter	Concentration (mg/L)		Load (lb/day)	
	Weekly Average [1]	Monthly Average [1]	Weekly Average [1]	Monthly Average [1]
BOD_5	33	22	93.8	62.4
TSS	33	22	93.8	62.4
pH, s.u	Within the range of 6.0 to 9.0 (instantaneous)			
BOD_5 Percent Removal [1] (%)	85 %			
TSS Percent Removal [1] (%)	85 %			

1 .See Definition section at end of permit for explanation of terms

IV. Water-Quality Based Effluent Limits (WQBELs)

A. Scope and Authority

The Montana Water Quality Act (Act) states that a permit may only be issued if the Department finds that the issuance or continuance of the permit will not result in pollution of any state waters [75-5-401(2), Montana Code Annotated (MCA)]. Montana water quality standards at ARM 17.30.637(2) require that no wastes may be discharged such that the waste either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard. ARM 17.30.1344(1) adopts by reference 40 CFR 122.44 which states that MPDES permits shall include limits on all pollutants which will cause, or have a reasonable potential to cause an excursion of any water quality standard, including narrative standards. The purpose of this section is to provide a basis and rationale for establishing WWTP effluent limits, based on Montana water quality standards that will protect designated uses of the receiving stream.

The Act authorizes the issuance of point source discharge permits on a listed water body pending completion of a TMDL provided that: 1) the discharge is in compliance with the provisions of 75-5-303 (Nondegradation Policy), MCA; 2) the discharge will not cause a decline in water quality for the parameters for which the water body is listed; and, 3) the minimum treatment requirements under 75-5-703(10), MCA are met.

B. Receiving Water

The Lolo WWTP discharges to the Bitterroot River identified as USGS Hydrologic Unit Code (HUC) 17010205, Bitterroot, MT and Montana stream segment 076H001-030 The Bitterroot River at the Lolo WWTP is classified B-1 [ARM 17.30.607(1)(a)]. Class B-1 waters are to be maintained suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life,

waterfowl and furbearers; and agricultural and industrial water supply [ARM 17.30.623(1)]. Degradation that will impact established beneficial uses is not allowed.

The 1996 303(d) list sites partial support for aquatic life support and cold water fisheries-trout for the Bitterroot River, in the area of the Lolo WWTP discharge. Probable causes of impairment include organic enrichment/DO, nutrients, thermal modifications, and other habitat alterations. The probable sources for these contaminants are agriculture, irrigated crop production, rangeland, stream bank modification/destabilization, onsite wastewater systems (septic tanks), and municipal point sources. The 2004 303(d) list includes partial support for aquatic life support and cold water fisheries-trout; citing nutrients, nitrate, siltation, other habitat alterations, and metals, copper and lead as the probable causes of impairment. The probable sources of this impairment include agriculture, grazing-related sources, habitat modification (other than hydromodification), bank or shoreline modification/destabilization, land disposal, sediment resuspension, and urban runoff/storm sewers.

The United States Geological Service (USGS) collects flow and other data for the Bitterroot River at gauging station number 12352500 near Missoula approximately 5 miles below the discharge at the Lolo WWTP. The 7-day, 10-year low flow (7Q10) for the Bitterroot River reported for this gauging station is 392 cfs or 253 million gallons per day (mgd). This results in a dilution ratio of 744 (253 mgd/0.340 mgd, the 7Q10 compared to the new design discharge flow for the facility.)

Fish species commonly present year-round include the brown and rainbow trout, largescale and longnose sucker, mountain whitefish, northern pike minnow, peamouth, and redside shiner. Incidental and rare species present can be the brook, westslope cutthroat, and bull trout, large mouth bass, northern pike, and pumpkinseed. Early life stages of each of these species can be present year-round.

Ambient water quality data for the Bitterroot River in the area of the Lolo WWTP were obtained from USGS gauging stations (12344000, 12347360, and 12350250) on the Bitterroot River, upstream and in the vicinity of Lolo. The period of record covers July 1982 through September 2003. The most current available data for ambient total ammonia-nitrogen were obtained from STOREASE for representative sites on the Bitterroot River collected between 1979 and 1996. A summary of the data is presented in Table 5.

Table 5. Bitterroot River Ambient Water Quality Monitoring Data POR 1979 through 2003

Parameter	Number of Samples	Long Term Average	Minimum Value	Maximum Value
pH, s.u.	58	7.85	7.10	8.80
Temperature, °C	334	9.1	0	23.0
Dissolved Oxygen, DO (mg/L)	12	11.3	8.4	13.6
Total Ammonia as N (mg/L)	37	0.028	<0.01	0.18
Nitrite + Nitrate as N (mg/L)	179	0.042	<0.005	0.246
Total Nitrogen (mg/L)	179	0.223	<0.105	1.646
Total Phosphorus as P (mg/L)	234	0.0208	<0.002	0.169

C. Applicable Water Quality Standards

Discharges to surface waters classified B-1 are subject to the specific water quality standards of ARM 17.30.623 (March 31, 2006), Department Circular DEQ-7 (February 2006), as well as the general provision of ARM 17.30.635 through 637. In addition to these standards, dischargers are also subject to ARM 17.30 Subchapter 5 (Mixing Zones, November 2004) and Subchapter 7 (Nondegradation of Water Quality, June 30, 2004).

ARM 17.30.635(4) requires that the design condition for disposal systems must be based on the 7-day average flow of the receiving water which is expected to occur on average once in 10-years (7Q10). More restrictive requirements may be necessary due to specific mixing zone requirements.

D. Mixing Zone

A mixing zone is an area where the effluent mixes with the receiving water and certain water quality standards may be exceeded [ARM 17.30.502(6)]. The Department must determine the applicability of currently granted mixing zones [ARM 17.30.505(1)]. Mixing zones allowed under a permit issued prior to April 29, 1993 will remain in effect unless there is evidence that previously allowed mixing zones will impair existing or anticipated uses [ARM 17.30.505(1)(c)]. Pollutant concentrations in the effluent must meet the applicable water quality standards at the end of pipe unless a mixing zone is recognized by the Department for that specific parameter in the permit.

In accordance with ARM 17.30.517(1)(b), acute water quality standards for aquatic life may not be exceeded in any portion of the mixing zone unless the Department finds that allowing minimal initial dilution will not threaten or impair existing uses. The discharge must also comply with the general prohibitions of ARM 17.30.637(1) which require that state waters, including mixing zones, must be free from substances which will:

(a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;
(b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials;
(c) produce odors, colors or other conditions as to which create a nuisance or render undesirable tastes to fish flesh or make fish inedible;
(d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and
(e) create conditions which produce undesirable aquatic life.

Although certain standards may be exceeded in the mixing zone, an effluent in its mixing zone may not block passage of aquatic organisms nor may it cause acutely toxic conditions [ARM 17.30.602(16)]. No mixing zone will be granted that will impair beneficial uses [ARM 17.30.506(1)]. Aquatic life-chronic, aquatic life-acute and human health standards may not be exceeded outside of the mixing zone [ARM 17.30.507(1)(a)]. Acute standards may not be exceeded in any part of the mixing zone [ARM 17.30.507(1)(b)]. However, ARM 17.30.602(16) states that an effluent in its mixing zone, may not block passage of aquatic organisms nor may it cause acutely toxic conditions, except ammonia, chlorine, and dissolved oxygen may be present at concentrations

so as to cause potentially toxic conditions in no more than 10% of the mixing zone provided that there is no lethality to aquatic organisms passing through the mixing zone.

A standard mixing zone may be granted for facilities which discharge less than 1 million gallons per day (MGD) or when mixing is nearly instantaneous [ARM 17.30.516(d)]. Nearly instantaneous mixing is assumed if the discharge is through an effluent diffuser, when the mean daily flow exceeds the 7-day, 10-year low flow (dilution ratio <1) or the permittee demonstrates through a Department approved study plan that the discharge is nearly instantaneous. A nearly instantaneous mixing zone may not extend downstream more than two (2) river widths.

Effluent discharges which do not qualify for a standard mixing zone mixing zone must apply for a source specific mixing zone in accordance with ARM 17.30.518 and must conform to the requirements of 75-5-301(4), MCA which states that mixing zones must be the smallest practicable size; have minimal effects on uses; and, have definable boundaries. ARM 17.30.515(2) states that a person applying for a mixing zone must indicate the type of mixing zone and provide sufficient detail for the Department to make a determination regarding the authorization of the mixing zone under the rules of Subchapter 5.

Review of the administrative file shows that the municipality did not have a Department-granted, defined mixing zone prior to April 29, 1993. The March 1993-developed SOB did not define a mixing zone for the discharge. The Lolo WWTP design discharge flow is less than 1.0 mgd (0.34 mgd). The dilution ratio is greater than 100:1 (744); therefore, the discharge qualifies for a standard mixing zone and the Department will use the full 7Q10 dilution flow of 392 cfs (253 mgd) to develop chronic effluent limitations where applicable [ARM 17.30.516(3)(a)]. Ten percent of the 7Q10 flow (25.3 mgd) will be used to develop acute effluent limitations where applicable [ARM 17.30.602(16)].

The length of a standard mixing zone must not exceed more than ½ the mixing width calculation as given in ARM 17.30.516(4)(a) or extend downstream from the point of discharge more than ten stream widths at 7Q10, whichever is more restrictive. Lacking information specific to the Bitterroot River at the outfall location, physical data obtained for the Bitterroot River at USGS gauging station 12344000 will be used to set the standard mixing zone length for Outfall 001. Stream physical data from 320 to 338 cfs were averaged from 1978 through 2004 (n=11). The resulting mixing zone distance is presented in Table 6.

Table 6. 1/2 Mixing Width Distance at 7Q10 from ARM 17.30.516(4)(a)

Stream Width	Stream Velocity	Channel Irregularity Factor*	Stream Depth	Shear Velocity	Down Stream Depth	Stream Slope	$A_{1/2} = [0.4(W/2)^2V]/CDU$
W ft	V ft^2	C	D ft	U $(32.2D_iS)^{1/2}$	D_i ft	S ft/ft	**$A_{1/2}$** **ft**
129.09	1.972	0.1	1.227	0.181	1.227	0.000829	**147,988**

* 0.1 for straight, rectangular streams

The resultant distance (147,988 feet) exceeds ten (10) times the stream width; therefore the mixing zone distance will be set at 1,291 feet downstream from the point of discharge. A special condition will be included in the permit requiring the permittee to define the mixing zone for parameters that exceed the standard at the end of pipe.

E. Basis and Proposed Water Quality-Based Effluent Limits

Parameters typically present in municipal wastewater that may cause or contribute to a violation of water quality standards include the conventional pollutants such as biological material (as measured by BOD_5), suspended solids, oil & grease, pathogenic bacteria, and pH; the non-conventional pollutants such as total residual chlorine, total ammonia, total nitrogen, and total phosphorus; and the carcinogenic and toxic pollutants such as volatile organic carbon substances and metals which can include, but is not limited to, arsenic, cadmium, chromium, copper, cyanide, lead, mercury, molybdenum, nickel, selenium, silver, and zinc.

ARM 17.30.1345 requires WQBELs to be developed for any pollutant for which there is reasonable potential (RP) for discharges to cause or contribute to exceedences of instream numeric or narrative water quality standards. RP calculations utilize the receiving water concentration, the maximum projected effluent concentration, the design flow of the wastewater treatment facility, and the applicable receiving water flow.

The Department uses a mass balance equation to determine RP (*Equation 1*).

$$C_{RP} = \frac{C_E Q_E + C_S Q_S}{Q_E + Q_S} \qquad \textit{(Eq. 1)}$$

Where:

C_{RP} = receiving water concentration (RWC) after mixing, mg/L
C_E = maximum projected effluent concentration, mg/L
C_S = RWC upstream of discharge, mg/L
Q_S = applicable receiving water flow, mgd
Q_E = facility design flow rate, mgd

Due to the lack of quantitative background data on the receiving water and adequate effluent characterization for some potentially harmful or toxic constituents (metals and organic pollutants), the Department is unable to determine what effluent limits may be necessary for the discharge at this time. The Department is proposing effluent limits for certain conventional pollutants for which adequate data exists. The permittee will be required to conduct whole effluent toxicity (WET) tests, discussed below, to demonstrate compliance with ARM 17.30.507(1)(b).

1. Conventional Pollutants

Total Suspended Solids (TSS), Biological Oxygen Demand (BOD_5), and pH: The facility provides a significant reduction in biological material and solids through secondary treatment (Section III). No additional WQBELs will be required for these parameters.

Oil and Grease (O&G): The previous permit did not limit O & G in the effluent. The permittee has documented problems with O & G for the facility and collections system. The proposed O & G instantaneous maximum limit is 10 mg/L pursuant to ARM 17.30.637(1)(b). Monthly monitoring for O & G will be required.

***Escherichia coli* (*E. coli*) Bacteria:** The permit will incorporate the recent change in the Montana state standards, which replaced fecal coliform bacteria, with *Escherichia coli* (*E. coli*), effective February 1, 2006. The applicable standards for *E. coli* are:

a. April 1 through October 31, of each year, the geometric mean number of the microbial species *E. coli* must not exceed 126 colony forming units (cfu) per 100 milliliters (mL), nor are 10% of the total samples during any 30-day period to exceed 252 cfu per 100 mL (ARM 17.30.623(2)(a)(i)); and

b. November 1 through March 31, of each year, the geometric mean number of *E. coli* shall not exceed 630 cfu per 100 mL and 10% of the samples during any 30-day period may not exceed 1,260 cfu per 100 mL (ARM 17.30.623(2)(a)(ii)).

The Department is not granting a mixing zone for *E. coli* based on the following considerations: 1) potential incomplete mixing of the effluent in the receiving water; 2) the potential for public recreation [ARM 17.30.506(2)(b), recreational area, means public beach or swimming area, and adjacent streams or lakes]; and, 3) ARM 17.30.637(1)(e) which requires that state waters must be free from substances that are harmful or toxic to human. ARM 17.30.505(2) states that if the Department determines that a mixing zone may interfere with or threaten a beneficial use, discharge limitations will be modified and if necessary, require the applicable numeric water quality criteria to be met at the end of the discharge pipe.

2. Nonconventional Pollutants

Nitrate Plus Nitrite as Nitrogen ($NO_{2/3}^-$) – Nitrate is specifically mentioned as a pollutant of concern for this segment of the Bitterroot River on the 2004 303(d) list. Nitrate is an oxidized form of nitrogen which is a prevalent pollutant in treated domestic wastewater. Activated sludge treatment is a secondary biological process that uses oxidation to treat domestic wastewater and produces nitrate nitrogen. Nitrite nitrogen is not normally present in measurable quantities in treated municipal wastewater. The state standard for nitrate as nitrogen for surface water is 10 mg/L (DEQ-7, February 2006). The maximum reported nitrate plus nitrite as nitrogen ($NO_{2/3}^-$) value, 20.5 mg/L, exceeds the state standard for nitrate as nitrogen and a defined mixing zone is necessary for this parameter.

To determine if the $NO_{2/3}^-$ concentrations in the effluent will create an exceedence of the state standard in the Bitterroot River after mixing, a reasonable potential (RP) analysis was completed using *Equation 1*, where:

C_{RP} = receiving water concentration (RWC) after mixing, mg/L
C_E = projected maximum effluent concentration, 28.7 mg/L
C_S = RWC upstream of discharge, 0.042 mg/L

Q_S = applicable receiving water flow, 100 % of 7Q10, 253.3 mgd
Q_E = facility design flow rate, 0.340 mgd

The projected maximum concentration for $NO_{2/3}^-$ was found following the method recommended by the EPA in the "Technical Support Document for Water Quality-Based Toxics Control" (1991). A coefficient of variation (CV), 0.57, was calculated by dividing the standard deviation (7.49 mg/L) by average concentration (13.19 mg/L), based on self-reported quarterly $NO_{2/3}$ concentrations. A multiplier of 1.4 was determined using Table 3-2 in the TSD (given a CV of 0.6, a sample size of 22 at the 95% confidence interval.) The maximum reported effluent $NO_{2/3}^-$ was 20.5 mg/L. The multiplier times the maximum concentration (1.4*28.3 mg/L) is 28.7 mg/L.

$$C_{RP} = \frac{(0.340*28.7) + (253.3*0.042)}{(0.340 + 253.3)} = 0.080 \text{ mg/L } NO_{2/3}^- \text{ as N}$$

The resulting downstream mixed concentration is 0.080 mg/L is below the standard of 10 mg/L therefore, RP does not exist for this parameter and no limit is necessary. However, the permit will contain a special condition requiring the permittee to define the mixing zone for this parameter.

Total Ammonia-N - Total ammonia-N limits are developed based on standards that account for a combination of pH and temperature of the receiving stream, the presence or absence of salmonid species, and the presence or absence of fish in early life stages. Because pH and temperature can vary greatly on a seasonal basis, as can the presence or absence of fish in early life stages, DEQ Circular DEQ-7 (February 2006) allows for the determination of ammonia standards and the resulting limits on a seasonal basis. Salmonid fishes and their early life stages are presumed present year-round.

Table 7, presents the total ammonia-N water quality standards for the Bitterroot River using the ambient Bitterroot River water quality data in Table 6.

Table 7. Total Ammonia-N Water Quality Standards for Receiving Water

Condition	Period (1)	Salmonids Present	Early Life Stages Present	Ambient Condition		Water Quality Standard (2)
				pH	Temperature °C	
Acute	Annual	Yes	NA	8.50(3)	NA	2.14
Chronic	Summer	NA	Yes	8.00(4)	15.0(4)	2.36
Chronic	Winter	NA	Yes	8.10(4)	4.0(4)	1.52

Footnotes: NA – Not Applicable

(1) Winter period is taken to be November 1 through March 30; Summer period is taken to be April 1 through October 30.
(2) 30-day average concentration, based on Department Circular DEQ-7 (February 2006)
(3) Based on 95th percentile of annual data.
(4) Based on 75th percentile of values in the applicable period.

The maximum reported total ammonia as nitrogen value, 22.79 mg/L, exceeds the state standards for total ammonia as nitrogen and a defined mixing zone is necessary for this parameter. Reasonable

potential (RP) to exceed the acute water quality standard for total ammonia-N after mixing was assessed using *Equation 1*, where:

C_{RP} = receiving water concentration (RWC) after mixing, mg/L
C_E = maximum projected effluent concentration, 43.3 mg/L
C_S = RWC upstream of discharge, 0.020 mg/L
Q_S = applicable receiving water flow, 10 % of 7Q10, 25.33 mgd
Q_E = facility design flow rate, 0.340 mgd

The projected maximum concentration for total ammonia – N was found following the method recommended by the EPA in the "Technical Support Document for Water Quality-Based Toxics Control" (1991). A coefficient of variation (CV), 1.58, was calculated by dividing the standard deviation (8.93 mg/L) by average concentration (5.65 mg/L), based on quarterly self-reported data for total ammonia – N concentrations. A multiplier of 1.9 was determined using Table 3-2 in the TSD (given a CV of 1.6, a sample size of 22 at the 95% confidence interval.) The maximum reported effluent for total ammonia – N was 22.79 mg/L. The multiplier times the maximum concentration (1.9*22.79 mg/L) is 43.3 mg/L.

$$C_{RP} = \frac{(0.340*43.3) + (25.33*0.020)}{(0.340 + 25.33)} = 0.222 \text{ mg/L}$$

This value is less than the acute ammonia standard of 2.14 mg/L, therefore, RP does not exist for this parameter and no limit is necessary. A special condition in the permit will require the permittee to define the mixing zone.

Nutrients (Total Nitrogen and Total Phosphorus as P): The state of Montana has both narrative and numeric water quality standards that apply to nutrients in the Clark Fork River basin. Nutrients, when present in excessive amounts, can contribute to interferences with the beneficial uses of surface waters. Measurable affects of increased and excessive nutrient levels are elevated algae biomass [as measured by the presence of chlorophyll *a* (Chl *a*)] and the dominance of aquatic life communities by pollutant-tolerant species. Algae overgrowth can be esthetically displeasing, contribute to taste and odor problems, impede flow, and create harmful conditions for aquatic life.

There are no numeric aquatic life water quality standards for nutrients that apply to the Bitterroot River in the area of the Lolo POTW discharge. However, the state has adopted numeric total nitrogen (TN) and total phosphorus (TP) standards for the mainstem of the Clark Fork River that apply during the period June 21 through September 21(ARM 17.30.631).

In addition to these numeric standards, the Department interprets the General Prohibition of ARM 17.30.637(1)(e) to apply to state waters when nutrient levels contribute to excessive algal biomass and causes adverse effects on other beneficial uses. ARM 17.30.637 requires that "state surface waters must be free from substances attributable to municipal discharges that will…create conditions which produce undesirable aquatic life".

As previously stated, the Bitterroot River in the area of the discharge is listed as partially supporting the designated uses for B-1 classified receiving waters on both the 1996 and 2004 303(d) lists. Organic enrichment, nitrate, and nutrients have been identified as probable sources of impairment.

The total daily maximum load (TMDL) for the Bitterroot River is slated for development in the 2007-2009 timeframe. Furthermore, in 1998 the USEPA approved the TN and TP total daily maximum load (TMDL) for the Clark Fork River (USEPA Ref. 8EPR-EP, October 1998). This TMDL established load allocations for the Bitterroot River above the confluence with the Clark Fork River for TN at 414 kg/day (910.8 lb/d) and 28 kg/day (61.6 lb/d) TP.

In order to protect both the receiving waters (the Bitterroot River) and downstream waters (the Clark Fork River), the Department is proposing nutrient limits for the growing season defined as the months of June through September, inclusive. Nutrient limits will not apply during the remainder of the calendar year.

The nutrient limits are based on the current performance of the POTW, using existing TN and TP loads as obtained from the Discharge Monitoring Reports (DMRs) for Outfall 001. DMR data for the months of June through September for the period of record January 2001 through September 2006 were utilized. Calculations are presented in Attachment B.

The Maximum Daily Limit (MDL) and Average Monthly Limit (AML) were developed using the long term average of the data set and the long term average multipliers for the 99th percentile based on the statistics of the data set (Technical Support Document, EPA/505/2-90-001, March 1991). These limits take into account the variability of the effluent quality and will apply to the effluent prior to mixing with the receiving water at Outfall 001 (no mixing zone). The formulae used are as follows:

MDL = LTA $e^{[2.356S - 0.5(S*S)]}$, use EPA TSD, Table 5-2 for 99th percentile,
AML = LTA $e^{[2.356S - 0.5(S*S)]}$, use EPA TSD, Table 5-2 for 99th percentile, n = 4

Until the implementation of a TMDL, the effluent TN and TP limits will serve as an interim wasteload allocation for the POTW. Additional reductions in nutrients may be necessary in the future as part of a basin-wide TMDL.

Table 8. Outfall 001 proposed TN and TP Loading Limitations

Parameter	Loading (lb/day)	
	Average Monthly Limit [1]	Maximum Daily Limit [1]
Total Nitrogen [2]	45.0	61.1
Total Phosphorus as P	8.2	10.2

Footnotes: NA = Not Applicable
1. See Definition section at end of permit for explanation of terms.
2. Calculated as the sum of Nitrate + Nitrite as N and Total Kjeldahl Nitrogen (TKN) concentrations.

Dissolved Oxygen (DO): The 1996 303(d) list identifies organic enrichment/DO as a probable cause of impairment on the segment of the Bitterroot River at Lolo. Dissolved oxygen is a typical

pollutant of concern for POTWs. The permittee will be required to monitor dissolved oxygen in the effluent to determine the extent, if any, of dissolved oxygen depletion in the mixing zone. The permit will contain a special condition requiring the permittee to define the mixing zone for this parameter.

Total Residual Chlorine (TRC): At present, the permittee utilizes chlorine disinfection with a maximum daily limitation of 0.5 mg/L. An effluent WQBEL of 0.011 mg/L chronic limitation (monthly average) and 0.019 acute limitation (daily maximum) shall be applied to the discharge at the end of pipe in accordance with Circular DEQ-7 (February 2006) due to the presence of aquatic organisms' early life stages in the receiving water year-round.. An interim effluent TRC daily maximum limitation of 0.50 mg/L will be implemented as part of a special condition in the permit, allowing the permittee time to evaluate disinfection of the effluent as required to meet the new TRC limit. On January 1, 2010, the final effluent limitation of 0.011 mg/L daily maximum and 0.019 mg/L 30-day average will become effective.

The EPA-approved analytical methods in 40 CFR Part 136 require TRC samples to be analyzed immediately. On-site analysis of TRC using an approved method is required. The method must achieve a minimum detection level of 0.1 mg/L. Analysis of effluent with results less than 0.1 mg/L is considered to be in compliance with the TRC limit.

pH: Pursuant to ARM 17.30.623(2)(c), the induced variation of hydrogen ion concentration within the range of 6.5 to 8.5 must be less than 0.5 pH units. Natural pH outside this range must be maintained without change. Natural pH above 7.0 must be maintained above 7.0.

3. Toxic Pollutants

ARM 17.30.623(2)(h) states that concentrations of carcinogenic, bio-concentrating, toxic, or harmful parameters which would remain in the water after conventional treatment may not exceed the applicable standards specified in Department Circular DEQ-7 (February 2006).

Total Recoverable Metals: The Bitterroot River in the area of discharge is on the 2004 303(d) list for copper and lead. Monitoring for total recoverable metals in the effluent has not been performed previously at this facility. There is a lack of information available to perform an RP assessment. Therefore, monitoring for these parameters will be included in this permit renewal. A requirement to perform WET testing will monitor potential toxicity in the effluent.

Organic Substances: Monitoring for organic substances in the effluent has not been performed previously at this facility. There is a lack of information available to perform an RP assessment. Therefore, monitoring for these parameters will be included in this permit renewal. A requirement to perform WET testing will also monitor potential toxicity in the effluent.

Whole Effluent Toxicity (WET) Testing: ARM 17.30.637(1)(d) requires that state water be free from substances attributable to municipal waste that create conditions which are harmful or toxic to human, animal, plant or aquatic life, except the Department may allow limited toxicity in a mixing zone provided that there is no acute lethality to organisms.

An assessment of toxicity in the effluent has never been performed at this facility and as such, the permittee will be required to monitor potential toxicity in the effluent by means of WET testing, in accordance with ARM 17.30.1322(6)(j). Starting with the first quarter of the calendar year 2010, acute static replacement WET testing of the effluent at Outfall 001 shall be conducted quarterly on two species. The permittee must use 40 CFR 136 approved analytical methods.

Should acute toxicity of the effluent be identified, a Toxics Identification/Toxics Reduction Evaluation (TIE/TRE) shall be undertaken by the permittee to: 1) establish the causes(s) of toxicity in the effluent and 2) develop control or treatment for the cause of toxicity. The Department may reopen the permit to impose additional controls or limitations on the discharge based on the results of WET testing and/or a TIE/TRE.

V. Interim and Final Effluent Limits

Outfall 001

Interim Limitations

The following interim effluent limitations will be applied to the discharge at Outfall 001, immediately upon the effective date of the permit and remain in effect through midnight December 31, 2009.

Parameter	Units	Average Monthly Limit [1]	Average Weekly Limit [1]	Maximum Daily Limit [1]
BOD_5	mg/L	22	33	NA
	lb/day	62.4	93.8	NA
TSS	mg/L	22	33	NA
	lb/day	62.4	93.8	NA
E. coli Bacteria [2, 3]	cfu/100 mL	126	NA	252
E. coli Bacteria [3, 4]	cfu/100 mL	630	NA	1,260
Total Nitrogen [4, 5]	lb/day	45	NA	61
Total Phosphorus as P [5]	lb/day	8.2	NA	10.2
Oil and Grease	mg/L	NA	NA	10
Total Residual Chlorine	mg/L	NA	NA	0.50

NA means not applicable.

1. See Definition section at end of permit for explanation of terms.
2. This limit applies during the period April 1 through October 31, annually.
3. Report Geometric Mean if more than one sample is collected during reporting period.
4. This limit applies during the period November 1 through March 31, annually.
5. Calculated as the sum of Total Kjeldahl Nitrogen (TKN) and nitrate/nitrite as N concentrations.
6. This limitation applies during the period June 1 through September 30, annually.

pH: Effluent pH from Outfall 001 shall remain between 6.0 and 9.0 standard units (instantaneous minimum and instantaneous maximum) unless a variation is due to natural biological processes. For

compliance purposes, any single analysis or measurement beyond this limitation shall be considered a violation of the conditions of this permit.

85 Percent (%) Removal Requirement for BOD_5: The arithmetic mean of the BOD_5 for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on BOD_5.

85 Percent (%) Removal Requirement for TSS: The arithmetic mean of the TSS for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on TSS.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

There shall be no discharge which causes visible oil sheen in the receiving stream.

Final Limitations

The following final effluent limitations will be applied to the discharge at Outfall 001, effective January 1, 2010 and remain in effect for the duration of the permit cycle.

Parameter	Units	Average Monthly Limit [1]	Average Weekly Limit [1]	Maximum Daily Limit [1]
BOD_5	mg/L	22	33	NA
	lb/day	62.4	93.8	NA
TSS	mg/L	22	33	NA
	lb/day	62.4	93.8	NA
E. coli Bacteria [2, 3]	cfu/100 mL	126	NA	252
E. coli Bacteria [3, 4]	cfu/100 mL	630	NA	1,260
Total Nitrogen [5, 6]	lb/day	45	NA	61
Total Phosphorus as P [6]	lb/day	8.2	NA	10.2
Oil and Grease	mg/L	NA	NA	10
Total Residual Chlorine	mg/L	0.011	NA	0.019

NA means not applicable.

1. See Definition section at end of permit for explanation of terms.
2. This limit applies during the period April1 through October 31, annually.
3. Report Geometric Mean if more than one sample is collected during reporting period.
4. This limit applies during the period November 1 through March 31, annually.
5. Calculated as the sum of Total Kjeldahl Nitrogen (TKN) and nitrate/nitrite as N concentrations.
6. This limit applies during the period June 1 through September 30, annually.

pH: Effluent pH from Outfall 001 shall remain between 6.0 and 9.0 standard units (instantaneous minimum and instantaneous maximum) unless a variation is due to natural biological processes. For

compliance purposes, any single analysis or measurement beyond this limitation shall be considered a violation of the conditions of this permit.
85 Percent (%) Removal Requirement for BOD_5: The arithmetic mean of the BOD_5 for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on BOD_5.

85 Percent (%) Removal Requirement for TSS: The arithmetic mean of the TSS for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on TSS.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

There shall be no discharge which causes visible oil sheen in the receiving stream.

VI. Self-Monitoring Requirements

All analytical procedures must comply with the specifications of 40 CFR Part 136. Samples shall be collected, preserved and analyzed in accordance with approved procedures listed in 40 CFR 136. In order to be representative of the nature and volume of the flow being monitored, influent sample collection and flow monitoring must occur prior to the equalization basin or any recycle flow returns.

Effluent Self-Monitoring (Outfall 001)

Self-monitoring of effluent discharged at Outfall 001shall be conducted at the discharge structure and samples will reflect the nature and effect of the discharge.

Outfall 001 Monitoring Requirements				
Parameter	Unit	Sample Location	Sample Frequency	Sample Type [1]
Flow	mgd	Influent	3/Week	Instantaneous
	mgd	Effluent	Continuous	[2]
5-Day Biological Oxygen Demand (BOD_5)	mg/L	Influent	3/Week	Composite
	mg/L	Effluent	3/Week	Composite
	lb/day	Effluent	1/Month	Calculated
	% Removal [3]	NA	1/Month	Calculated
Total Suspended Solids (TSS)	mg/L	Influent	3/Week	Composite
	mg/L	Effluent	3/Week	Composite
	lb/day	Effluent	1/Month	Calculated
	% Removal [3]	NA	1/Month	Calculated
pH	s.u.	Effluent	Daily	Instantaneous
Temperature	°C	Effluent	Daily	Instantaneous
Total Residual Chlorine	mg/L	Effluent	Daily	Grab
E. coli Bacteria [3]	cfu/100 mL	Effluent	3/Week	Grab
Total Ammonia as N	mg/L	Effluent	1/Week	Composite
Nitrate + Nitrite as N [4]	mg/L	Effluent	1/Month	Composite
Nitrate + Nitrite as N [5]	mg/L	Effluent	1/Week	Composite
Total Kjeldahl Nitrogen [4]	mg/L	Effluent	1/Month	Composite
Total Kjeldahl Nitrogen [5]	mg/L	Effluent	1/Week	Composite
Total Nitrogen [4, 6]	mg/L	NA	1/Month	Calculated
	lb/day	NA	1/Month	Calculated
Total Nitrogen [5, 6]	mg/L	NA	1/Week	Calculated
	lb/day	NA	1/Month	Calculated
Total Phosphorus as P [4]	mg/L	Effluent	1/Week	Composite
	lb/day	NA	1/Month	Calculated
Total Phosphorus as P [5]	mg/L	Effluent	1/Month	Composite
	lb/day	NA	1/Month	Calculated
Dissolved Oxygen	mg/L	Effluent	1/Week	Grab
Oil and Grease [7]	mg/L	Effluent	1/Month	Grab
Total Dissolved Solids (TDS)	mg/L	Effluent	1/Quarter	Grab
Whole Effluent Toxicity, Acute [8]	% Effluent	Effluent	1/Quarter [8]	Grab

Footnotes: NA = Not Applicable

1. See Definition section at end of permit for explanation of terms.
2. Requires recording device or totalizer; permittee shall report daily maximum and daily average flow on DMR.
3. Report Geometric Mean if more than one sample is collected during reporting period.
4. Applies during period October 1 through May 31, annually.
5. Applies during the period June 1 through September 30, annually.
6. Calculated as the sum of Nitrate + Nitrite as N and Total Kjeldahl Nitrogen (TKN) concentrations.
7. Collect a sample and analyze using EPA Method 1664, Revision A: N-Hexane Extractable Material (HEM) or equivalent.
8. Sampling for this parameter is required starting first calendar quarter of 2010.

Outfall 001 Additional Monitoring Requirements				
Parameter	Unit	Sample Frequency	Sample Type [1]	ML
Antimony, Total Recoverable [2]	µg/L	2/year	Composite	1
Arsenic, Total Recoverable [2]	µg/L	2/year	Composite	1
Beryllium, Total Recoverable [2]	µg/L	2/year	Composite	1
Cadmium, Total Recoverable [2]	µg/L	2/year	Composite	0.1
Chromium, Total Recoverable [2]	µg/L	2/year	Composite	10
Copper, Total Recoverable [2]	µg/L	2/year	Composite	1
Lead, Total Recoverable [2]	µg/L	2/year	Composite	1
Mercury, Total Recoverable [2]	µg/L	2/year	Composite	0.1
Nickel, Total Recoverable [2]	µg/L	2/year	Composite	10
Selenium, Total Recoverable [2]	µg/L	2/year	Composite	1
Silver, Total Recoverable [2]	µg/L	2/year	Composite	1
Thallium, Total Recoverable [2]	µg/L	2/year	Composite	1
Zinc, Total Recoverable [2]	µg/L	2/year	Composite	10
Cyanide, Total	µg/L	2/year	Grab	5
Phenols, Total	µg/L	2/year	Grab	10
Hardness, Total (as $CaCO_3$)	mg/L	2/year	Composite	10
Volatile Organic Pollutants [3]	mg/L	2/year [4]	Composite	[5]
Semi-Volatile, Acid Compounds [3]	mg/L	2/year [4]	Composite	[5]
Semi-Volatile, Base Neutral [3]	mg/L	2/year [4]	Composite	[5]

Footnotes:
1. See Definition section at end of permit for explanation of terms.
2. Metals shall be analyzed as total recoverable, use EPA Method (Section) 4.1.4 [EPA 600/4-79-020, March 1983] or equivalent. Sampling for these parameters required in second and third full calendar years of permit cycle only.
3. 40 CFR 122, Appendix D, Table II.
4. Sampling for these parameters required in third and fourth full calendar years of permit cycle only.
5. See approved method for minimum level.

VII. Nonsignificance Determination

As discussed in the previous sections, the proposed effluent limits and discharge flows for the Lolo WWTP discharge do not constitute a new or increased source of pollutants pursuant to ARM 17.30.702(18). Therefore, a nonsignificance analysis is not required [ARM 17.30.705(1)].

VIII. Special Conditions

1. Mixing Zone

ARM 17.30.515(2) requires a person applying to the Department for a mixing zone to indicate the type of mixing zone applied for (standard or source specific) and supply sufficient detail for the Department to make a determination regarding the authorization of the mixing zone under the rules of this subchapter.

The mixing behavior of any wastewater discharge is based on the interplay of ambient conditions in the receiving water and discharge characteristics. The mixing zone study should include the information necessary to predict, using modeling, mixing at the critical condition (receiving water flow at 7Q10) as well as in stream monitoring to demonstrate compliance with the defined mixing zone distance of 1,291 feet. Specific parameters identified as requiring acute and/or chronic mixing zones include, but are not limited to: nitrate plus nitrite as nitrogen, total ammonia as nitrogen, and dissolved oxygen.

Ambient conditions are described by the geometry of the receiving water including the shape, depth and bottom topography of the receiving stream, especially near the discharge. Other characteristics necessary for a mixing zone study are the velocity and density of the receiving water, especially near the discharge.

A. Authority: ARM 17.30.515(2)1322(1), and 75-5-301(4), MCA, requires a person applying to the Department for a mixing zone to indicate the type of mixing zone applied for (standard or source specific) and supply sufficient detail for the Department to make a determination regarding the authorization of the mixing zone under the rules of this subchapter. According to statute, mixing zones granted by the Department must be specifically identified and must have: 1) the smallest practicable size, 2) a minimum practicable effect on water uses, and, 3) definable boundaries.

B. Schedule: The permittee must submit a mixing zone study to the Department within two (2) years after the effective date of this permit. As determined in Section IV, above, the mixing zone study shall include, but is not limited to, the following parameters: nitrate/nitrite as nitrogen, total ammonia as nitrogen, and dissolved oxygen. Based on the mixing zone study, the permittee may request a modification of effluent limits in this permit. Upon receipt of the major modification request, the associated fees, and review and approval of the mixing zone study by the Department, the Department will determine if modification of effluent limits in the permit is appropriate.

IX. Other Information

On September 21, 2000, a US District Judge issued an order stating that until all necessary total maximum daily loads (TMDLs) under Section 303(d) of the Clean Water Act are established for a particular water quality limited segment, the State is not to issue any new permits or increase permitted discharges under the MPDES program. The order was issued under the lawsuit Friends of the Wild Swan vs. US EPA et al, CV 97-35-M-DWM, District of Montana, Missoula Division.

The renewal of this permit does not conflict with Judge Molloy's order because the permitted discharge does not represent a new or increased source of pollutants under the MPDES program.

Information Sources

1. Administrative Rules of Montana Title 17 Chapter 30 - Water Quality
   a. Sub-Chapter 2 - Water Quality Permit and Application Fees, November 2003.
   b. Sub-Chapter 5 - Mixing Zones in Surface and Ground Water, November 2004.
   c. Sub-Chapter 6 - Montana Surface Water Quality Standards and Procedures, September 2004.
   d. Sub-Chapter 7- Nondegradation of Water Quality, November 2004.
   e. Sub-Chapter 10 - Montana Ground Water Pollution Control System, September 2004.
   f. Sub-Chapter 11 - Storm Water Discharges,
   g. Sub-Chapter 12 - Montana Pollutant Discharge Elimination System (MPDES) Standards, March 2003.
   h. Sub-Chapter 13 - Montana Pollutant Discharge Elimination System (MPDES) Permits, March 2003.

2. Clean Water Act § 303(d), 33 USC 1313(d) Montana List of Waterbodies in Need of Total Maximum Daily Load Development, 1996 and 2004.

3. Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. §§ 1251-1387, October 18, 1972, as amended 1973-1983, 1987, 1988, 1990-1992, 1994, 1995 and 1996.

4. Montana Code Annotated Title 75 - Environmental Protection Chapter 5 - Water Quality, October 2002.

5. Montana Department of Environmental Quality Circular DEQ-2, Design Standards for Wastewater Facilities, September 1999.

6. Montana Department of Environmental Quality Circular DEQ-7, Montana Numeric Water Quality Standards, February 2006.

7. Montana Department of Environmental Quality Source Water Protection Plan for Stevensville, Darby, and Hamilton, Montana, May 2002

8. Montana Department of Fish Wildlife and Parks D. Skaar, Spawning Times of Montana Fishes, March 2001.

9. Montana Pollutant Discharge Elimination System (MPDES) Permit Number MT0020168
   a. Administrative Record, archived.
   b. Renewal Application DEQ Form 1 and EPA Form 2A, 2006.

10. Tri-State Implementation Council, Clark Fork River Voluntary Nutrient Reduction Plan, August 1998.

11. Tri-State Water Quality Council, Water Quality Status and Trends in the Clark Fork-Pend Oreille Watershed, *Trends Analysis from 1984 – 2002*, April 2004.

12. US Code of Federal Regulations, 40 CFR Parts 122-125, 130-133, & 136.

13. US Code of Federal Regulations, 40 CFR Part 403 – General Pretreatment Regulations for Existing and New Sources of Pollution.

14. US Code of Federal Regulations, 40 CFR Part 503 – Standards for the Use or Disposal of Sewage Sludge.

15. US Department of the Interior US Geological Survey, Statistical Summaries of Streamflow in Montana and Adjacent Areas, Water Years 1900 through 2002, Scientific Investigations Report 2004-5266, 2004.

16. US EPA Technical Support Document for Water Quality-Based Toxics Control, EPA/505/2-30-001, March 1991.

17. US EPA NPDES Permit Writers' Manual, EPA 833-B-96-003, December 1996.

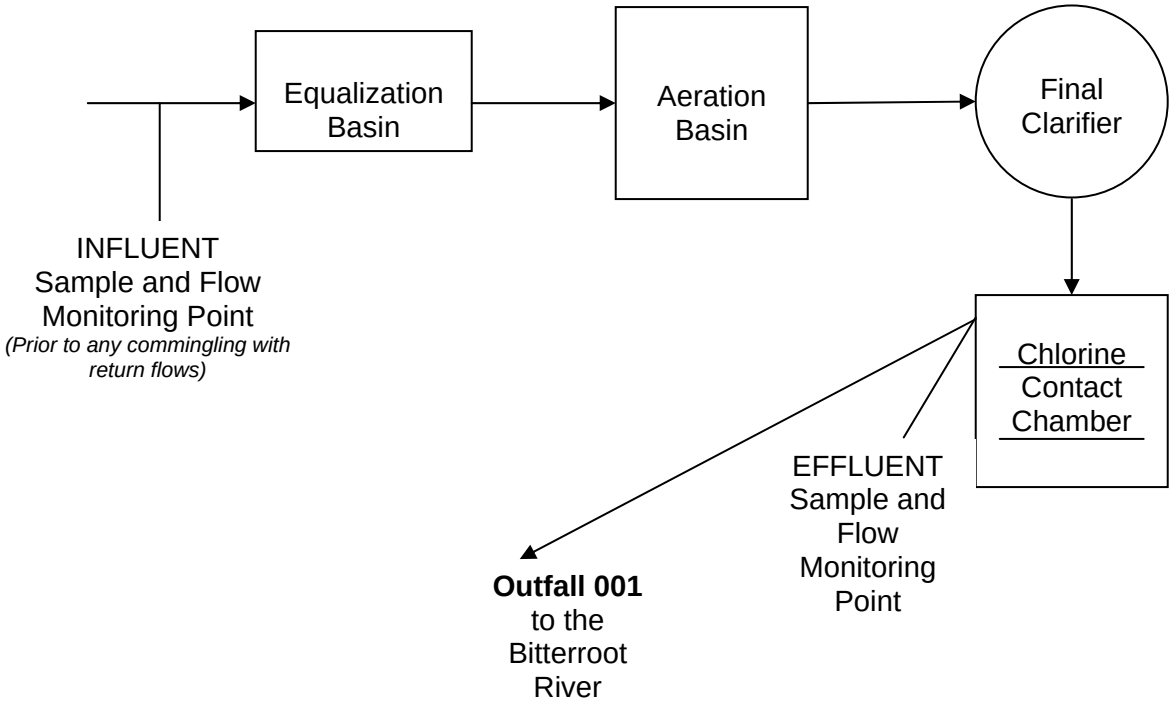
18. US EPA Region VIII NPDES Whole Effluent Toxics Control Program, August 1997.

19. US EPA Ref. 8EPR-EP, Clark Fork River Total Maximum Daily Load, October 1998.

20. US EPA NPDES Permit Writers' Course Manual, EPA-833-B-91-001, April 2003.

Attachment A

Schematic of Lolo WWTP with Sample and Flow Monitoring Points



Not to scale.

Attachment B. Nutrient Limits Calculations

Month	Year	Total Phosphorus as P (lb/day)	Total Nitrogen (lb/day)
June	2001	3.90	28.43
Sept.	2001	7.82	31.60
June	2002	6.30	41.72
Sept.	2002	7.34	37.96
June	2003	6.57	30.59
Sept.	2003	4.26	34.69
June	2004	6.89	25.54
Sept.	2004	6.78	25.90
June	2005	6.89	28.93
Sept.	2005	6.78	31.99
June	2006	7.53	34.12
Sept.	2006	7.5	34.1
n =		12	12
Average		6.55	32.13
Standard Deviation		1.237	4.760
Coefficient of Variation (CV)		0.2	0.1
Maximum - LTA Multiplier *		1.55	1.90
Average - LTA Multiplier **		1.25	1.40

	TP	**TN**
***Maximum Daily Limit (MDL), lb/day**	**10.2**	**61.1**
****Monthly Average Limit (AML),lb/day**	**8.2**	**45.0**

Source: EPA, 1994, TSD, Table 5.2, MDL 99th Percentile
Source: EPA, 1994, TSD, Table 5.2, AML 99th Percentile, n=4